Historical, Structural, and Macroeconomic Perspectives on the Japanese Economic Crisis

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Paul Krugman once noted that it is not remarkable that people tend to favor structural interpretations for economic problems. Losing one's job or seeing one's wealth fall by a factor of two or three is often a tragedy for workers and their families. It is an anathema that this might be the result of some bureaucrat accidentally miscalculating the money supply in one's own country or, even worse, in some other country. How can such pain be caused by something so trivial as misreading information about monetary aggregates? Yet, these are exactly the explanations that economic theory suggests are critical in understanding business cycles. Hence it is not surprising that in all countries there is a tendency to give business cycles a structural interpretation.

Consider, for example, the first Japanese macroeconomic crisis for which detailed data exist. Between 1876 and 1880, Japan began the process of developing a modern banking sector. As in the 1980's, the liberalization of finance had unintended monetary consequences. Namely, money supply grew due to the very rapid increase in circulation of private bank notes. Hence, while government paper money grew by about 4% per year over this time period, the total money supply, comprised of government and national bank notes, grew at an annual rate of 11% (Rosovsky, p. 128). This rapid expansion in the money supply was coupled with a dramatic fall in taxes which were based in part on the nominal value of land. Government tax revenue as a share of net domestic product fell by almost a factor of two. This combined fiscal and monetary stimulus led to substantial overheating of the Japanese economy. Between 1878 and 1880,

Ohkawa (1958) estimates that Japanese per capita real income grew at the astonishing annual rate of 18% (p. 340).

In 1881, the Japanese Minister of Finance, Matsukata Masayoshi, cut the money supply dramatically. This had the predictable effect of causing a dramatic contraction in the economy. Japanese taxes as a share of NDP also rose sharply largely eliminating the benefits to taxpayers that had accrued in the earlier period. As a result of this, Japanese real per capita income growth went sharply negative: averaging around minus 7% for the first two years of Matsukata's term. This, coupled with a worldwide slump in the early 1880's, meant that income did not return to its 1880 level until 1885.

As one might expect from such a contraction, there was considerable hardship for both financial and non-financial firms. As Rosovsky notes, the number of joint stock companies fell by over half. Moreover, the impact on the financial sector was also severe. Eight per cent of Japan's banks had failed by 1884. While deposits in Japanese banks rose by 35% between 1881 and 1885, lending fell by 18% over the same time period. Japan was experiencing a credit crunch.

It is interesting to note how western observers reacted to the crisis at the time. Allen (1946, p.41) provides two quotes from the leading English language newspaper in Japan at the time, the *Japan Gazette*,

> "Wealthy we do not think Japan will ever become: the advantages conferred by nature, with the exception of climate forbid it." 1881

> "The national banking system of Japan is but another example of the futility of trying to transfer Western growth to an Oriental habitat. In this part of the world principles, established and recognized in the West, appear to tend fatally towards weediness and corruption." 1882

Many authors have used quotes such as these as evidence of the short sightedness of foreigners observing the Japanese system. Certainly it is fair to say that very few people predicted the eventual rise of Japan over the next century. However, one should also bear in mind how difficult it is to predict the future. How many of us could accurately predict which country is likely to have the world's highest per capita income in one hundred years?

For the purposes of this paper, however, what is most striking about these quotes is not how badly observers in the 1880's predicted the 1980's, but rather how badly they understood what was happening in the 1880's. It was absolutely obvious that the crisis in the 1880's was macroeconomic, not structural, but the interpretations seem oddly preoccupied with structural features of the Japanese economy. Certainly, the failure of many banks was due to the fact that they were mismanaged, but given that the Japanese price level fell by 25% between 1881 and 1884, there is little doubt that many banks ran into difficulty because they simply failed to predict inflation accurately.

Indeed, by trying to explain macroeconomic shocks with structural explanations, not only did contemporary analysts miss the true explanation of what was happening, they also misunderstood the important structural changes that were taking place. The really big story in the 1870's and 1880's was the very successful creation of the banking system, stock market, educational system, and governmental structure that were to be the foundation of future Japanese economic growth. With perhaps the exception of the banking system, these institutions were only tangentially related to the short-term macroeconomic performance of Japan. But it was hard for contemporary observers to separate Japan's impressive attempts to adopt foreign knowledge and institutions from their contemporaneous growth rates.

Of course the major question we are faced with today is to what extent the current Japanese recession reflects structural factors and to what extent is it simply a macroeconomic phenomenon. We are certainly not immune from conflating the two explanations. It now seems fairly clear that an overvalued dollar and an over-expansionary monetary policy contributed to very rapid Japanese growth in the 1980's. However, when the yen was trading at 250 to the dollar, the success of Japan was often attributed to industrial policy, just-in-time delivery, permanent employment, and a host of cultural characteristics. Today, America's resurgence is popularly attributed to restructuring. However, it is also obvious that the yen's movement from an average level of 239 to the dollar in 1985 to 94 in 1995 probably has something to do with the difficulties that US producers faced at the beginning of the period relative to now.

What is quite surprising, in retrospect, is how hard it was for people to see how important the macroeconomic phenomena were even in the 1980's. It was not uncommon to observe contemporary observers writing statements that now seem strangely at odds with the present. Authors such as Clyde Prestowitz in *Trading Places* (1988) claimed that "Few, if any, American companies can compete with the Japanese in areas the latter deem important." Because of this, Prestowitz argued the US and Japan would "trade places." In some sense, Prestowitz was right. In the 1980's, the US was a troubled economy while Japan was seen as the model to emulate. Today, the reverse is true. Japan and the US have traded places, although not in the way Prestowitz imagined.

One of the major problems with trying to explain economic performance with structural explanations is that structural features of an economy change very slowly. Structural features of economies may be very important in understanding long-run phenomena, but they are probably less important in understanding short-run patterns. If one wants to explain short-run growth

patterns by focusing on structural features, one must be prepared to rapidly adjust what one considers to be strengths and weaknesses. Fortunately, we seem to have a tremendous capacity for "double-think." As Eugene Dattel (1993) has pointed out, the very same features that were seen as tremendous Japanese assets are now seen as liabilities. For example, in 1987 *Business Week* wrote,

> "As American Business has ample reason to know, when the Japanese home in on a new market, they aim at the bull's eye. In three short years, guided by strategic planning that subordinates quick profits to long-term market growth, four major Japanese firms, Nomura, Daiwa, Nikko, and Yamaichi, are well on their way to becoming major players in US financial markets." [September 7, p. 122]

Of course, Yamaichi is now bankrupt and the other three firms are struggling for their survival. Within three short years *The Economist* would conclude, "Japanese financial institutions border on the primitive" (December 8, 1990, p. 3). If *The Economist* is right, one must question how these primitive institutions convinced the world they were guided by "strategic planning."

Or consider views of Japan's bureaucracy. In 1995, Chalmers Johnson, long a proponent of the ability of the Japanese bureaucracy to guide the economy successfully, wrote,

> "The US must either begin to compete with Japan or go the way of the USSR.... Even if they must ignore or fire some academic economists, Americans can no longer ignore the view that 'countries that try to promote higher value, higher-tech industries will eventually have more of them than countries that don't.'"

Three years later the *Wall Street Journal* opined in an editorial, "Japanese officialdom seems especially clueless" (4/16/98). Were Japanese bureaucrats ever prescient or clueless or do these gyrations in opinion reflect the difficulty of attributing macroeconomic shocks to structural features? The point is not that the first set of observers was wrong and the second set right. Rather, economies change much more rapidly than their institutions, so one should be cautious about attributing any short-run phenomenon, be it good or bad, to structural features.

With perfect hindsight, it appears clear that a major problem with our interpretation of the 1980's was that there was some confusion between macroeconomics and structural interpretations of the Japanese economy. A relevant question is whether at least some of our current pessimism about Japan isn't also conflating some of the two factors.

Consider the current crisis. Between 1989 and 1997, real per capita GDP grew at an annual rate of only 1.4 per cent. This crisis has been widely characterized as the worst postwar economic crisis that Japan has faced. This is somewhat misleading. Japan started the postwar period in 1946 with a per capita GDP level that was approximately the same as thirty years earlier. As Ito (1996) and others have shown, the first twenty or so years of Japanese postwar development represented a period of catching up to the trends established in the prewar period. Since Japan spent much of this time period returning to the prewar growth path, it is not surprising that its growth rate was relatively fast until it returned to its path in 1963.

What is more puzzling is why Japan's real per capita GDP grew at an average rate of 8.5% between 1963 and 1973. One important factor to bear in mind is that Japan's good performance was not unique. Over the same time period real per capita US GDP expanded at an average rate of 2.9%. This period marks a time of remarkable expansion for the US economy. Between 1938 and 1960, real per capita GDP grew at an average rate of 3.4% [Maddison (1982)] as opposed to only 1.9% between 1900 and 1938.

This trend acceleration in the US is relevant because a major determinate of Japanese growth is technological catch-up. The prewar Japanese growth rates of 2.9% were sufficient to generate convergence with a much slower growing US. If Japanese growth rates had just returned to the level of GDP predicted by its prewar trend and then continued at that growth rate, the US and Japan would have diverged between 1938 and 1973. Because the 1963 per capita

GDP level was only 37% of the that in the US, Japan would have had to have grown at a 6.4% per capita rate just to converge to 50% of the US level by 1973.

Other authors have looked at this more formally. Baumol, Blackman, and Wolff (1989) plot annual GDP per work-hour growth rates and initial GDP per work-hour for 16 industrialized between 1950 and 1979. Convergence theory suggests that there should be a negative relationship between these variables. Their analysis suggests there is. The Japanese point lies almost exactly on the fitted line; there is simply nothing distinctive about Japanese growth rates relative to the rest of the OECD over this period. While there are interesting questions surrounding why Japan did better than many African, South Asian, and Latin American economies, Japan's long-run performance relative to the OECD is not a puzzle. More to the point, given the forces of convergence at work, it is not surprising that Japan did not experience any prolonged recession in the first thirty years of the postwar period.

Japan's short-run recent experience is more complex, however. Japan's first major postwar recession followed the first oil shock, when the Japanese real GDP growth rate suddenly fell from 8% in 1973 to –1% in 1974. The recovery was slow and painful; between 1973 and 1978, the Japanese real per capita GDP growth averaged only 2.1%. This is not much faster than the 1.9% rate recorded between 1989 and 1994. Certainly considering that Japan was relatively a much poorer country in 1973 than in 1989 and hence should have grown much faster, the performance over these two time periods is actually quite comparable.

It is often argued that part of the reason for the poor performance in this period was that the Bank of Japan (BOJ) conflated structural and macroeconomic problems.[1] Following the first oil shock, the BOJ decided to target its policy at eliminating the inflationary aspects of the oil shock rather than treating the rise in energy prices as a negative supply shock. The growth rate

of M_2 + CD's fell from an average of over 20% per year for the three years before 1973 to 11.9% per year in 1974. The tighter monetary policy had the desired effect of reducing inflation but at the cost of a major recession.

While the Japanese economy performed comparably in the first five years following the first oil shock and the first five years following the bursting of the bubble, the performance over the next five years was quite different. The early 1980's mark a period in which the dollar became substantially overvalued relative to the yen. Because the B OJ learned from it's mistake after the first oil shock, when the second one hit, the BOJ did not raise rates. By contrast, a tight money policy in the US caused interest rates to rise substantially, leading to a dramatic appreciation of the dollar against the yen in the early 1980's.

As the dollar fluctuated between 210 to 249, Japanese exports surged (see Figure 1). Between 1978 and 1981, the volume of Japanese exports rose by 30% and import volumes remained virtually unchanged. By 1985, the volume of Japanese exports had risen by 69% while imports had only risen by 16%. This dramatic rise in exports helped speed Japan's recovery and generated tremendous frictions with Japan's trading partners.

The macroeconomic picture following the recent bubble stands in sharp contrast to what we have seen in the early 1980's. The tight money policy pursued by the BOJ, even in the face of the East Asian crisis, has contributed to a tremendous appreciation. The strong yen explains why export volumes rose by 16% between 1993 and 1997, but import volumes rose by 36%. While monetary policy helped Japan export its way out of the first crisis, this has not happened in the current crisis.

The notion that the cause of Japan's current ills are fundamentally macroeconomic is bolstered by the fact that the Japanese economy does seem to respond to standard

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[1] I am indebted to an anonymous referee for suggesting I pursue this line of argumentation.

macroeconomic stimuli. For example, in 1996 a temporary tax cut caused the Japanese real per capita GDP to grow at 3.6%. This was faster than any other country in the G7 and led the government to raise taxes in the belief that the worst was behind them. It is an open question whether this would have been the right decision had the East Asian crisis not struck in 1997. However, given the good fortune of the having the dollar overvalued in the 1980's and the misfortune of having the current Asian crisis strike just as Japan was getting back on its feet, one should not underestimate the role played by bad luck.

Today's long-term economic crisis are not without precedent. The historical record suggests that there have been numerous occasions in which Japan stagnated for relatively long time periods. The prewar period produced many such slumps punctuated by remarkable periods of growth. According to the Long Term Economic Statistics [Ohkawa (1974)], Japan's real per capita income growth rate averaged 2.1% between 1885 and 1940. This is comparable to the 2.7% real per capita GDP growth rate that the Japanese economy recorded between 1973 and 1996. What is perhaps most surprising is that despite the slightly more rapid overall prewar growth rate, the earlier period was punctuated by many recessionary or slow growth periods. For example, before the second world war there were two long periods (1895-1914, 1919-1932) in which per capita income growth rates averaged under 0.6%. By this standard, the recent recession would not even count. In other words, with the exception of the immediate postwar experience, recessions and periods of relative stagnation have always been a feature of Japanese economic development. These slow growth periods account for about one third of the prewar economic period.

Structural Impediments to Growth

Our previous emphasis on macroeconomic phenomena does not mean that structural features are unimportant. One can identify a number of ways in which structural characteristics have affected the current situation in Japan. First, few people would deny that the mountain of bad debt held by Japanese financial institutions constitutes a severe structural problem. The insolvency of the financial sector may spill over into other sectors as well. Indeed, Peek and Rosengren (1997) present persuasive evidence that Japan is experiencing a credit crunch arising from the unwillingness of Japanese banks to lend money. Obviously the resolution of this banking crisis is something that is of paramount importance for Japanese economic prosperity.

While the insolvency of the financial sector may be seen as a structural problem, banking crises that arise from severe asset deflations are not unique to the Japanese economic system. In the 1930's and 1980's, the US also had banking crises that had real economic effects. Other countries whose land and stock prices have risen and fallen dramatically have also experienced similar crises. Given that Japanese stock prices fell by a factor of three from their peek and urban land prices fell by as much as 70%, it is not surprising that Japanese financial institutions found themselves saddled with large amounts of bad debt. I therefore would like to consider the banking crisis, per se, part of the macroeconomic explanation.

Posen (1998) has forcefully argued that beyond the banking crisis, it is safe for policymakers to ignore structural issues as a means of pulling Japan out of the recession. Posen cites an OECD (1998) study that found that structural reform would not raise Japanese GDP by more than 5.6%. This number is quite small compared to potential macroeconomic gains from pulling out of the current recession.

One of the problems with this argument is that the gains from structural reform are likely to be much larger than those suggested by the OECD. Moreover, structural reform may be a necessary complement to the macroeconomic policy. There are several reasons why one might believe that structural reform is more important than the OECD suggest. First, the substantial deregulation that has already occurred in the 1990's was not counted toward the potential gains, only future reforms were considered. This works to push down the impact. Second, financial market, insurance, and construction deregulation was not allowed to have any impact in the calculation of Japan's number even though these are precisely the areas that are often seen as most important in the reform effort. Third, the OECD *assumed* that the impact of deregulation on productivity was 6% or less in four of the five sectors that they examined. As I shall argue shortly, this number seems far too small.

More importantly, in reviewing the causes of the bubble, it seems hard to argue that one can divorce Japan's current dilemma from its structural problems. While it probably was the case that the BOJ pursued an overly expansionary monetary policy during the late 1980's, it is important to ask why. The first thing to recognize is that this was not a simple policy mistake but was deeply linked to the Japanese government's recalcitrance about structural reform.

As Miller and Milhaupt (1997) have documented, deregulation of the foreign bond market coupled with widespread interest rate regulation in other sectors caused Japan's heavily regulated financial system to pump large amounts of money into real estate investment. Similarly, the liberalization of the domestic bond market in the 1980's fundamentally changed the relationships between monetary policy and monetary aggregates. Had Japan not opened its markets to international capital flows and had Japan's regulatory system not forced certain investors to hold real estate, it is unlikely that the BOJ would have misjudged money supply

growth. Indeed, the linkages to BOJ policy were sufficiently murky that even economists interested in the reasons behind the asset inflation at the time did not see BOJ policy as central. For example, French and Poterba (1990) wrote a paper entitled, "Are Japanese Stock Prices Too High?" that sought to explore the reasons for the rise in Japanese stock prices. Interestingly, they made no mention of BOJ policy. Even after the crash, when the paper appeared a year later [French and Poterba (1991)] with the new title, "Were Japanese Stock Prices Too High?" monetary policy was still not seen as the culprit.[2]

While this does not prove that monetary policy was unimportant, it certainly was not obvious to extremely insightful economists that this was the principle explanation of what was happening in Japan. Indeed, the argument that what happened in Japan was purely driven by macroeconomic policy is not as airtight as some would suggest. In order to believe that the BOJ caused the bubble to burst by raising interest rates in 1989, one must also believe that the central bank could control long-run interest rates. This is often seen as beyond the purview of central banks. Indeed, when Ueda (1990) tested whether stock prices were being driven by interest rates, he rejected the hypothesis. Hence, it is not unreasonable to question whether there were other factors involved.

There is good reason to believe structural reform is intimately linked with the current crisis. Financial liberalization probably helped cause the money supply expand faster than the BOJ had expected. While raising interest rates may have slowed the economy, it is not at all clear that BOJ policy was the sole cause for the tremendous asset inflation and deflation. Macroeconomic policy mattered a lot but so did other policy. Much of Japan's problem during the 1980's and 1990's arose from the fundamental inconsistency of having returns demanded by the market differ from those being set by the government. Fundamentally, it was incompatible

[2] I am indebted to Anil Kashyap for making this point about French and Poterba's paper.

for Japan to allow firms to move capital freely in and out of the country while maintaining a system whereby some institutions were paying above market returns and others were paying below market returns. Structural reform in Japanese finance seems to be a necessary condition for stable Japanese economic development.

Of course, structural reform in Japan is occurring in many sectors beyond finance. The 1990's probably will be seen as a watershed period in Japanese development similar to the immediate postwar period. The character of Japanese finance, insurance, telecommunications, transportation, and retailing are undergoing dramatic changes. As Saxonhouse (1988) has argued, one of the hallmarks of Japanese development has been rapid structural change in industries: Japan's ability to reinvent itself. The rapid rise and fall of industries has placed considerable pressure on foreign countries that held seemingly insurmountable leads. The real question for the future is whether the Japanese are going to be able to do in finance, telecommunications, insurance, and other non-tradables what they did in cars, electronics, steel, and semiconductors.

Japan's accomplishments in manufacturing are even more surprising given the widespread pessimism about Japan following the Second World War. Japan started this period with much of the country in ruins, and it was very hard for contemporary scholars to see how Japan could adjust to a non-militarized, non-colonial future. For example, as late as 1950, the eminent scholar Edwin O. Reischauer saw many reasons for pessimism, writing,

> "It is unlikely that Japan can recover economically without the restoration of trade with Northern Korea, Manchuria, and China proper. And yet it is not difficult to visualize the continuation of the present situation in which trade with these regions is all but nonexistent.... Even if Japan should be able to restore normal trade with the rest of the world, it is still not certain that she can reestablish a viable economy.... Add to this situation the heavy cost of rebuilding her cities and reconstructing her damaged and disrupted industries and the resulting picture is one of almost unrelieved gloom. [p. 298-9]

Despite these problems, Japan was able to make the necessary structural adjustments and grew at 8% per year over the next decade. The fact that Japan's future success has never been obvious to contemporary observers should temper our characterizations of Japanese firms as "primitive." On the one hand, it is hard to see Japan catching up to the US in finance. On the other hand, it was hard to see Japan catching up the US in automobiles too.

While it impossible to predict the future, we can make some headway into understanding what is at stake in Japanese structural reforms. To do this we shall focus on two issues. The first is whether there is evidence of large-scale inefficiency in some or all of the Japanese economy. The second is whether there is evidence that Japanese government policy may have insulated firms from competition and therefore nurtured inefficient industries. If all the stories about relative Japanese inefficiencies are correct, then these should have a counterpart in terms of productivity. Fortunately Jorgenson and Kuroda (1990) have painstakingly put together a data set that matches productivity levels in Japan and the US for 28 sectors comprising all elements of each economy. Jorgenson and Kuroda used 1970 purchasing price parities to calibrate industry total factor productivity (TFP) and then calculated TFP growth rates that account for capital, energy, materials, labor, and labor quality growth. These data are the most carefully constructed series for international comparisons.

An unfortunate feature of the Jorgenson and Kuroda data is that the series only go until 1985. This makes it impossible to use these series for understanding more recent trends. Therefore, I have updated these series by using TFP indices generated by the OECD. The OECD's International Sectoral Database contains compatible information on TFP in manufacturing and non-manufacturing sectors for 10 OECD countries.

The data quality of the OECD numbers is lower than that of the Jorgenson and Kuroda numbers for several reasons. First, rather than basing the TFP numbers on output, they are based on value added. Second, the only inputs that are used in the calculation are aggregate labor and capital. This means that the TFP numbers are going to be an amalgam of productivity due to TFP and improvement in the quality of inputs. However, because most of the increase in educational attainment in Japan and US occurred prior to 1985, these problems are probably not severe in the more recent data.

Jorgenson and Kuroda have already noted that there is only limited evidence in favor of productivity convergence. In this section we begin by repeating the Jorgenson and Kuroda exercise by aggregating the TFP indices. The results from this exercise are plotted in Figure 2. Not surprisingly, data reveal a very similar pattern as that reported in Jorgenson and Kuroda. Overall there is no evidence of convergence in aggregate productivity between Japan and the US. Figure 2 also presents evidence on relative productivity in manufacturing and non-manufacturing sectors. When we examine these series an interesting pattern emerges. Between 1960 and 1980 Japanese TFP in manufacturing rose from being only 79% of the US level to 94% and persisted at this level for over a decade.[3]

Lawrence and Weinstein (1999) have investigated some of the determinants of this technological catch up between Japan and the US more formally. The data reveal that manufacturing industries in Japan that were farther behind tended to catch-up more quickly after

[3] It is interesting to note that the relative catch-up in manufacturing persisted until 1991 when there was dramatic divergence. Between 1991 and 1993 Japanese productivity in manufacturing fell from 93% of the US level to 81%. This very recent divergence arises in part because of the procyclicality of measured productivity. With the US coming out of a recession, measured productivity rose in the US by 7% over this time period while productivity in Japan fell by a similar margin. To some extent this probably reflects the fact that employment and capital stock numbers move relatively slowly compared with output and prices. This tends to cause productivity to rise during booms and fall during busts, and makes it relatively easy to conflate structural and macroeconomic problems. Permanent employment makes Japanese firms seem less productive during recessions when output is low and

controlling for a number of industry characteristics. In other words, there is evidence of convergence *in manufacturing*. Moreover, we find no evidence that sectors that exported more intensively grew faster. On the contrary, we find that higher levels of import intensity are associated with more rapid technological convergence. In other words, those advocating "export-led growth" have it exactly backwards. It is imports that matter.

Lawrence and Weinstein argue that the principle mechanism through which imports have historically raised productivity in Japan is by inducing higher levels of competition. Japanese firms may not like to compete with foreigners in their domestic market, but the evidence suggests that the competition makes them better firms. In other words, the main message from the Lawrence and Weinstein (1999) work is that liberalization to foreign competition is an important conduit for growth in manufactures. Since one can easily think of similar channels operating in non-manufacturing sectors, it is reasonable to conjecture that the absence of significant foreign competition in Japanese non-manufacturing sectors may have important productivity consequences. Likewise efforts to liberalize these sectors today may raise future productivity.

If the data tell us overall productivity did not converge but manufacturing productivity did, then the reason for the lack of convergence must be divergence in the non-manufacturing sectors. This is exactly what we see in Figure 2. Between 1960 and 1985 the relative gap in productivity in non-manufacturing sectors actually increased by 11%. The cause of this was stagnation of productivity growth in the Japanese services sector. Between 1960 and 1985, aggregate TFP in manufacturing rose by 29% and in Japan as a whole by 11%. By contrast in non-manufacturing sectors, it only rose by only 3%. This is quite different from the US

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employment high and more productive during booms when the reverse is true. Furthermore, it is also possible that some of this decline reflects real economic costs for manufacturers as a result of the banking crisis in Japan.

experience in which productivity growth in manufacturing and non-manufacturing rose by 18 and 15 per cent, respectively.

This failure to obtain convergence evenly across Japanese sectors helps explain an important phenomenon regarding the price level in Japan and is clear evidence of the well-known Balassa-Samuelson effect. Purchasing power parity between Japan and the US has long been seen as out of line with the exchange rate.[4] The TFP evidence suggests a reason. The exchange rate is determined in part by equilibrating the prices of tradables across countries. The convergence in TFP in manufacturing meant that tradables prices tended to be quite similar in Japan and the US. However, the lower productivity in Japanese non-manufacturing sectors meant that the prices of non-tradables in Japan were significantly higher than in other countries. While this is not the only explanation for why prices in Japan have tended to be so high, the magnitudes suggested by this analysis are impressive. If the exchange rate were set at a rate in 1985 that equilibrated the prices of Japanese and US goods, then this implies that the prices of non-tradables in Japan should have been 35% higher than non-tradables in the US.[5] This certainly helped contribute to the notion that something was quite different about the structure of the Japanese economy.

A second important result from these data underscores the importance of measurement in doing international TFP comparisons. The Jorgenson and Kuroda study represents the most careful international comparison of TFP levels in the literature. In fact, the data requirements were so stringent that no other countries have ever been compared in as careful a manner. This raises the question of whether careful measurement matters. At least for Japan and the US, the answer appears to be yes. Bernard and Jones (1996) and Ito (1996) use OECD data to examine

[4] See Marston (1987) for a more detailed discussion and analysis of this point.

productivity growth rates in Japan and the US and come up with substantially different results. Both of these papers find fairly rapid productivity growth rates in non-traded goods sectors, and Bernard and Jones find fairly rapid convergence between Japan and the US in both manufactured and non-manufactured goods. The most likely explanation for their results is that by not accounting for improving Japanese labor productivity, they overstated the rate of growth of Japanese productivity.

If we take the Jorgenson and Kuroda numbers as accurate, we still have an important unanswered question: why has productivity growth been so slow in non-manufacturing sectors. Certainly these sectors are measured with the most error. Measuring the output of a bank or a consultant is notoriously difficult, and it is possible that our results are in part due to this difficulty. However, it still is puzzling why in the US productivity grew at approximately the same rate in both manufacturing and non-manufacturing, but in Japan, manufacturing did so much better than non-manufacturing. While we cannot rule out measurement error, we would like to also consider some alternative hypotheses.

One possible explanation for these different trends is the level of government involvement in these sectors. Government intervention in sectors can adversely affect productivity growth in a country through two important channels. First, if government interventions prop up inefficient industries, that will tend to hold back growth by funneling too many of a country's resources into inefficient activities. Second, if government policies are misguided they may actually retard efficient investments or innovations within industries.

Beason and Weinstein (1996) examined targeting by the Ministry of International Trade and Industry and found that Japanese targeting tended to focus on slow growth industries. That

[5] I am considering agriculture to be a non-tradable good. Given the high level of protection in Japan during this time period, this assumption is not groundless.

paper also examined the role of industrial policy in Japanese TFP growth and found little impact. A related question is whether the targeting of sectors led to faster convergence between Japan and the US. Using the Beason and Weinstein data I calculated correlations between the level of targeting as given by the importance of JDB loans, subsidies, tariffs, and taxes to each industry. These indexes were then correlated with the growth rate of relative TFP over the period 1960 to 1985. For every policy measure except net subsidies, there was a negative correlation between the degree of assistance and the amount of convergence. This indicates that sectors that converged the most were those that tended to have little assistance.

The one policy that is positively correlated with convergence is net subsidies. However, upon closer inspection it appears that this result is driven by two outliers. Processed foods and petroleum and coal had extremely negative net subsidy rates and extremely poor performance. Indeed the magnitude of their negative net subsidy rates was between four and six times higher than that of any other industry in the sample. When we drop these industries from the sample, the correlation for the remaining industries is –0.44. This indicates that while there may be some evidence that extremely high tax rates may be associated with poor performance, there appears to be, in general, either no relationship or a negative relationship between targeting and convergence in manufacturing. In other words, both channels of government impact seem important. Industrial policy in Japan appears to have increased the size of slow growth sectors and impeded their technological convergence.

It is much more difficult to establish a linkage between government policy in non-manufacturing sectors because industrial policy in these sectors is often non-transparent and quite complex. Rather than try to approach this formally, we take a more casual approach, remembering that correlation is not necessarily an indicator of causation.

If we look at non-manufacturing sectors there are a few sectors that stand out (see Figure 2). First, three sectors exhibit either no evidence of convergence or actually diverge: agriculture, construction, and transportation and communication. In agriculture, productivity did not only fall relative to the US but also in absolute terms within Japan. Despite (or perhaps because of) tremendous protection, subsidies, and other policies, Japanese agriculture started out approximately even with US agriculture in 1960 but fell to one half the US level by 1985 (see Figure 3). This was due to a 47% rise in the productivity of US agriculture coupled with a 26% decline in Japanese productivity. In construction, which is another very heavily regulated industry, Japanese productivity fell by 24% over this time period.

Transportation and communication is another example of an industry with radically different regulatory histories in Japan and the US (see Figure 4). In the US, deregulation of airlines, trucking, telephone, and television was accompanied by extremely rapid growth rates in productivity. Productivity growth in transportation and telecommunications in the US was more than double that in any other services sector, averaging a whopping 3.4% per year between 1960 and 1993. In Japan, deregulation has proceeded far more slowly. Productivity growth over the same time period was less than half that in the US. It is not hard to understand why regulation of airline and trucking pricing and routes and the slow liberalization of telecom may have held back productivity growth in Japan. But whatever the cause, the failure of Japan in this realm is staggering. In 1960, regulation restrained competition in this industry in both Japan and the US, and Japanese productivity in this sector was within 1% of the US level. By 1993, the tremendous growth of productivity in the US in this sector caused the Japanese level of productivity to fall to only 71% of the US level.

These data suggest that there are very serious structural problems in Japan. Very heavily regulated and protected sectors seem to perform significantly worse than in the US. Moreover we do not see evidence of convergence in these sectors. Japan is behind, and the gap is widening.

Other sectors exhibit more complex patterns. Of particular interest is what has been happening in Japanese financial services and real estate. Interestingly, this is a sector that has been converging at one of the fastest rates of any sectors in the Japanese economy. However, what is interesting about this sector is that its path of convergence has been very uneven. In 1960, Japanese finance was the most undeveloped sector in the Japanese economy in terms of its productivity relative to the US. The Jorgenson and Kuroda data reveal that Japanese financial institutions were less than one third as productive as US institutions.

This may account for some of the early rapid productivity growth in financial services and real estate. Between 1960 and 1973, productivity in Japanese finance rose by 4.9% per year. By contrast, productivity in non-manufacturing industries as a whole rose only by 0.7% per year over this same time period. Hence even by Japanese standards the productivity gains in finance were quite impressive. However, between 1973 and 1982, productivity growth in financial services stagnated. In fact, there was literally no growth in productivity over the entire decade. If we look at other Japanese sectors over the same time period, we find that there was a slight decline in productivity for non-manufacturing industries as a whole over this time period and a slight increase in manufacturing sectors. If we use the US as the reference point a very similar pattern emerges. Between 1960 and 1973, the productivity level of Japanese financial services grew from being less than one third that of the US to just over one half. Over the next decade its level relative to that of the US hardly rose at all. What might explain this pattern?

An obvious candidate is regulation. Over the course of the 1960's and early 1970's the Ministry of Finance and the Bank of Japan became increasingly involved in Japanese financial markets. In 1962 Japanese tax law was changed to favor trust banks and insurance companies over mutual funds, thereby helping solidify the *keiretsu* system [see Weinstein (1997) for a more complete treatment]. In addition government regulations over portfolio management as well as large-scale interventions in the Japanese stock market helped to favor the dominance of banks and insurance companies over smaller financial institutions. Between 1960 and 1973, the share of equity owned by financial institutions rose from 23.1% to 33.9% as trust banks and insurance companies solidified their holdings of other corporations. Over the next twenty years the share of financial institution holdings would only rise by another 5.5 percentage points and most of that rise occurred before 1980. In other words the financial dominance of financial institutions was far more clear in 1973 than in 1960.

The rise of corporate groups in Japan was paralleled by a rise in regulation. One crude measure of the growth of regulation in this industry is the shear number of pages of the MOF's banking law. Seiichi Katayama and I have compiled an index of how many pages of banking regulations the MOF had on its books. Between 1960 and 1973, MOF banking regulations almost doubled from 656 pages to 1297 pages. Over the next 19 years, the number of pages of banking regulation only increased by 89 pages. To the extent this is a measure of the degree of financial regulation, 1973 marks the finalization of the rules governing Japanese regulation of financial services.

The low rate of TFP growth in finance continued until Japan began serious liberalization of its financial markets in the subsequent decade. The watershed event was the revision of the Foreign Exchange Control Law in 1980. Weinstein and Yafeh (1998) argue that the most

important factor driving the transformation of the Japanese system was the dramatic liberalization of the Japanese bond market 1982. Interestingly, many of these policy changes correspond to break points in the TFP data.

Regardless of whether one believes that regulation was the cause of this slowdown in productivity growth in Japanese financial services, the point remains that for approximately one decade prior to the beginning of Japanese financial market liberalization, productivity in Japanese finance was stagnant. What is equally striking is what has happened to productivity in Japanese finance over the period between 1982 and 1994. Despite all of the financial disasters in the Japanese finance, insurance, and real estate sectors, productivity growth over this period has averaged 0.9% per year. This is faster than comparable rates in the US and faster than productivity growth in Japanese manufacturing. In 1993, Japanese finance was almost two-thirds as productive as finance in the US as opposed to being only half as productive in 1980.

Hence, there appears to be some concrete evidence that structural reform is occurring in Japanese finance and that this sector is beginning to converge with the US. Despite the popular notion that Japanese finance is "primitive," there is evidence that over the last two decades Japanese finance has become more efficient. Indeed, if these trends persist, Japan will converge with the US in finance in 20 years.

The Future

The productivity evidence indicates that the productivity gap significantly affects Japanese standards of living. This information can be used to obtain estimates of how important structural reform is to Japanese standards of living. While we do not have good productivity

data for all industries up to 1993, we do have data for industries accounting for approximately three quarters of Japanese GDP. Using GDP weights, our estimate for the average TFP level of Japan in 1993 is 75% of that of the US.

In terms of understanding the importance of structural change, we need to address the counterfactual of what would happen in Japan if structural change does not occur. A dire prediction is that Japan would fall behind other countries, and we may actually observe divergence. A more reasonable assumption is that if Japan does nothing its productivity will tend to track that of the US, but convergence will not occur. Let's assume that Japanese productivity growth in the absence of any structural reforms will equal the rate of US productivity growth between 1983 and 1993. This would put predicted Japanese productivity growth at about 1% per year.

Now we can consider how important structural reform is likely to be. Assuming that the US represents best practice in all industries, then if Japan were to eliminate all of its structural problems, its GDP would rise by 33%. Obviously, this is going to take some time to achieve. Many of the reform proposals now being undertaken in Japan are going to take years to phase in and progress is undoubtedly going to be slow. Suppose that it takes 20 years for Japan to fully liberalize its economy to the level of the US. In this case, the convergence of Japanese productivity to US levels would raise Japanese growth rates by 1.5% per year more than they would ordinarily be. Given that reasonable estimates for US long-run per capita growth rates tend to be in the 2-2.5% range, structural change in Japan may result in Japan outgrowing the US by a substantial margin for many years to come. Clearly, a lot is at stake.

Conclusion

We have analyzed the Japanese economic crisis from a macroeconomic and structural perspective. Japan's macroeconomic situation, while poor in recent terms, is certainly not unprecedented. Historically, Japanese economic development has been quite bumpy and the recent postwar experience is exceptional in part due to the devastation caused by the Second World War and the exceptional performance of the US economy between 1938 and 1973. There are many reasons to believe that much of the poor performance of Japan during the 1990's is due to a series of macroeconomic shocks that have buffeted the economy rather than simply a sudden collapse of the Japanese system.

However, the evidence also indicates that large structural problems exist in Japanese non-traded goods sectors, and these contribute to Japan's woes. Total factor productivity in these sectors is considerably below that of the US. Unlike in manufacturing many of these sectors do not appear to be approaching US levels of productivity. This exerts a substantial drag on the Japanese economy. Japanese finance, after having undergone a period of relative stagnation in the 1970's appears to be restructuring quite rapidly and enjoying impressive productivity gains. If other sectors perform similarly, Japanese productivity growth may be higher than US growth by 1.5% for the next 20 years. This underscores the importance of structural reform in Japan.

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Figure 1

Export Volume less Import Volume (Exports and Imports in 1990 set to 100)

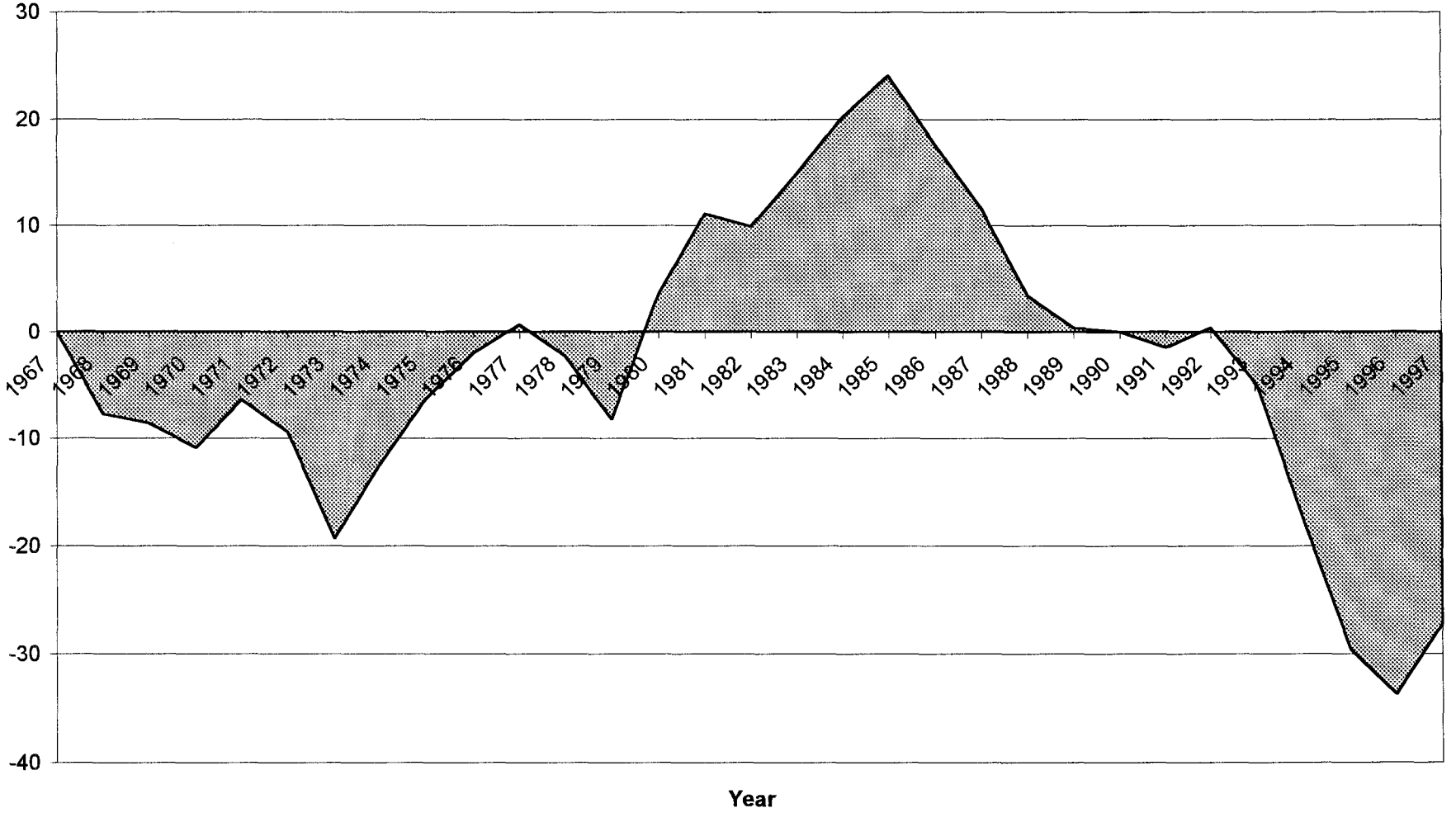


Figure 2
Japanese Productivity Relative to the US (1960-1993)

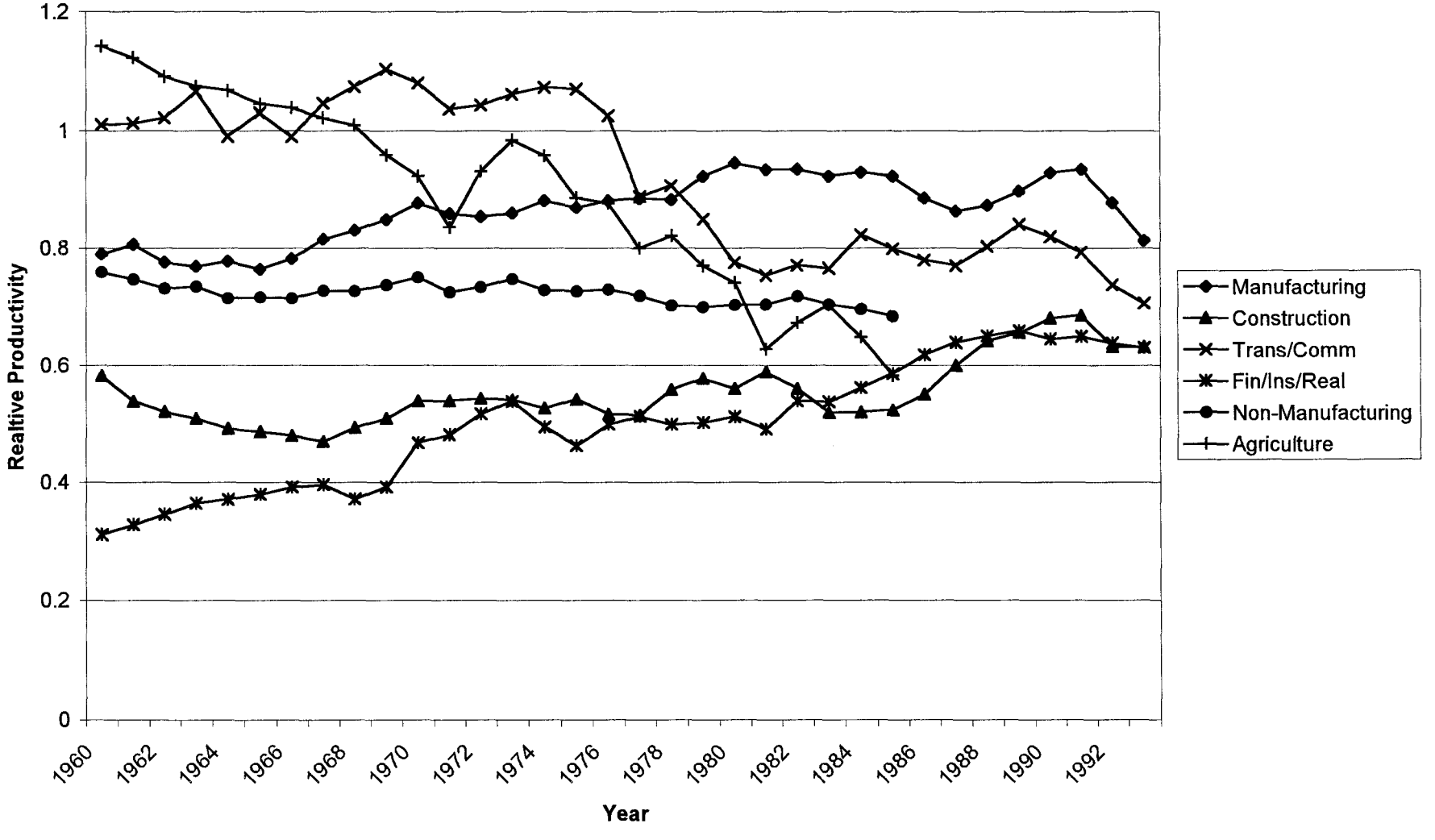


Figure 3
Productivity Growth in Agriculture in Japan and the US

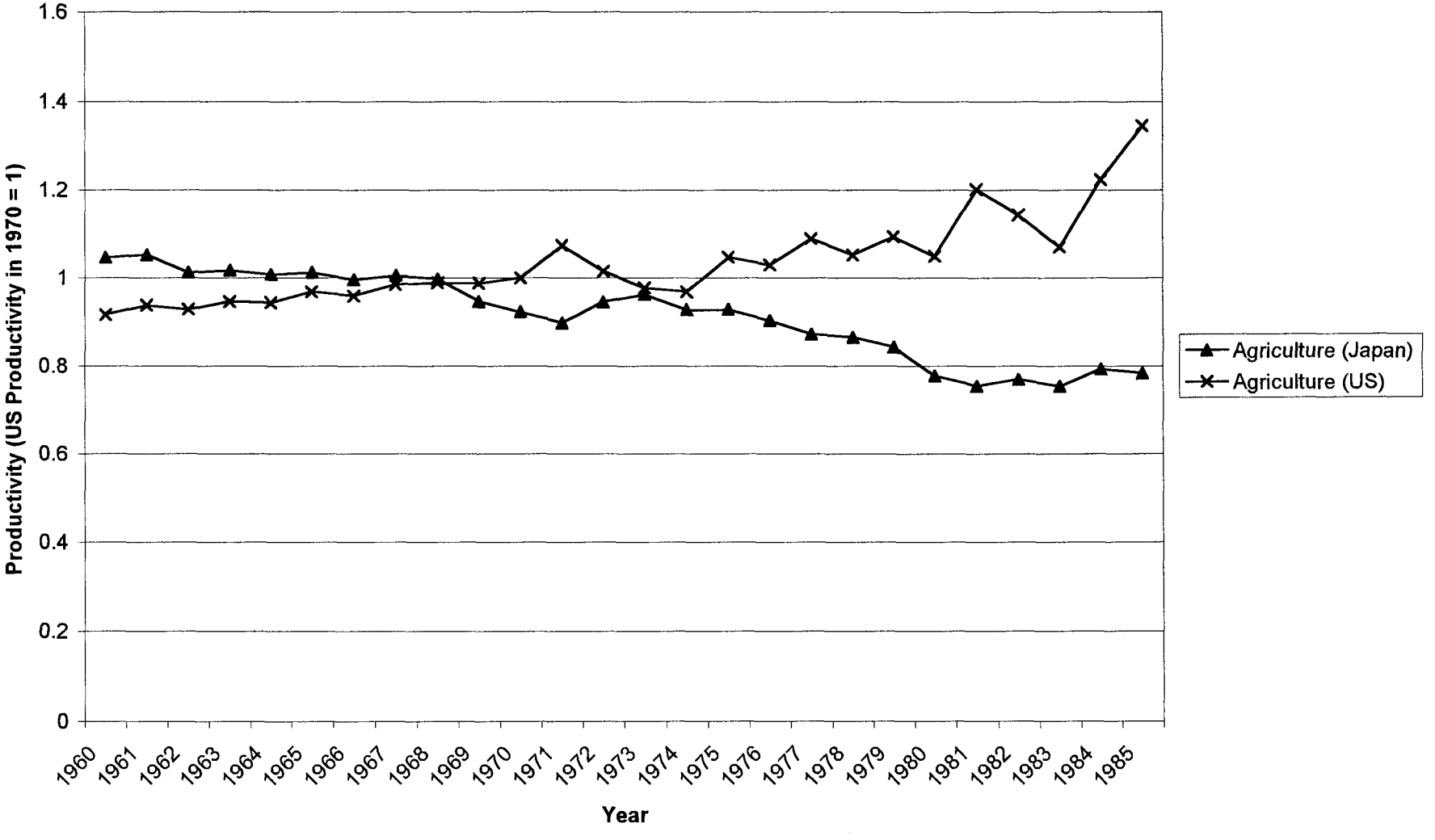
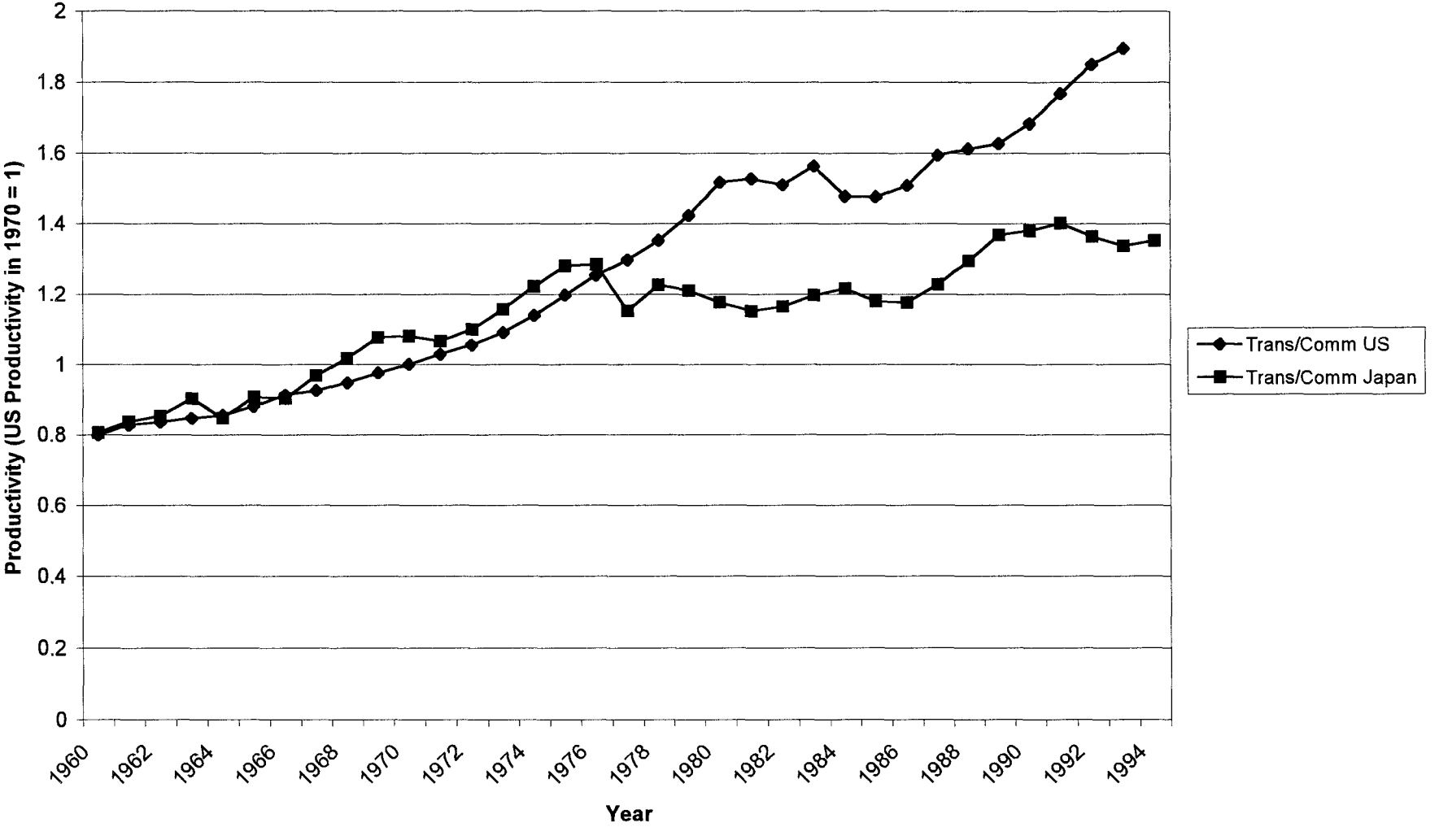


Figure 4
Productivity Growth in Transportation and Communication in Japan and the US



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